FACE INVESTIGATION

SUBJECT: Farmer Dies After he was Entangled in the Driveline Shaft of a Manure Spreader

SUMMARY: An 24-year-old male farmer (the victim) died after becoming entangled in the unguarded rotating driveline shaft of a manure spreader. The spreader was connected to a tractor equipped with a power take-off (PTO), which powered the spreader driveline. The victim was working alone in the barnyard, replacing a bolt on the shaft. He apparently had completed this task, and was standing on ice-covered soil near the rotating driveline. Then, he either slipped and fell onto the driveline, or his clothing was caught and pulled by protruding parts of the rotating shaft. He was spun around the driveshaft, and portions of his clothing were entangled on the driveshaft and torn from his body. His wife approached the site of the incident when her husband had not returned to the farmhouse as expected, and found him entangled on the driveline. The tractor engine was not running. She called to the victim's brother who was working in the barn, and he freed the victim by cutting the tightly tangled clothes. The brother summoned EMS, while the victim's wife began CPR. EMS responded within several minutes. The coroner's office was contacted, and pronounced the victim dead at the scene. The FACE investigator concluded that, to prevent similar occurrences, farm machine/equipment operators should:

- **observe and follow all applicable safety precautions when operating machinery driven by tractor power take-off equipment, including disengaging the PTO and stopping the tractor engine before approaching the machinery to make repairs, adjustments or perform maintenance.**

- **identify machinery/equipment components that are PTO driven, and ensure that appropriate guards, recommended by the manufacturer or dealer, are installed.**

- **avoid wearing clothing that is loose-fitting, or has loose ends that could be caught by moving machine parts and lead to entanglement**

INTRODUCTION:

On February 25, 1999, a 24-year-old male farmer died after being entangled in the PTO-drive driveline shaft of a manure spreader. The Wisconsin FACE field investigator learned of the incident through a call from the WI Workers' Compensation Division on February 25, 1999. On September 10, 1999, the field investigator visited the farm and met with the victim's wife. The FACE investigator also obtained the death certificate, the state climatologist's report, and the sheriff's and coroner's reports.

The farmer and his wife were raised on farms in community settings that depended on horses instead of powered machinery. When the farmer was about sixteen years old, he moved with his family to the farm where the incident occurred. They switched from horse-drawn equipment to gasoline and electric powered machines during this period. He worked with his parents at the site for about six years, then his wife moved to the farm and the couple took over the farm's operation. The farmer's brother lived on the property and assisted with farm chores. They milked about 35 cows, and raised corn and hay for cattle feed.

The victim had also worked for other dairy farmers before he operated his own farm, and for a farm equipment dealer where he learned to repair machinery. He attended classes for crop and soil management, but had not received formal training in farm machine safety. There were no written safety policies or procedures for the farm activities. Usually, the farmer's wife milked the cows and the farmer did other farm chores of feeding and barn cleaning. The farmer also repaired and maintained the farm equipment. He had verbally warned family members about the hazard of contacting the rotating drive shaft of the manure spreader, and would usually walk around the tractor and spreader to avoid contacting the rotating drive shaft. Prior to the incident, there were no fatalities on the farm.

INVESTIGATION:

The farmsite consisted of a dairy barn, storage sheds and grain bins, a famhouse, mobile home, and surrounding crop fields. The barnyard was adjacent to the farmhouse. On the day of the incident, the soil was frozen and covered with snow. There were patches of ice in the barnyard, and the outdoor air temperature was about 23EF. The victim dressed in layers of pants, coveralls, a long loose-fitting insulated coat, and rubber boots. The farmer's wife completed the milking chores and went into the house to prepare for a meeting in town. Meanwhile, the victim unloaded manure using the spreader. The manure spreader was old, and did not have a driveline guard when it was obtained from an unknown source before the victim began operating the farm. He told his wife about a broken piece on the spreader driveline shaft, and his intention to repair the part with a bolt before going to the meeting with her. He drove a PTO-equipped tractor with the spreader to the barnyard, and replaced a broken bolt on the driveline. Apparently, he started the tractor engine and the PTO, and was standing next to the rotating shaft to inspect the operation. He may have been using a shovel to scrape ice from driveline parts before the incident occurred. Then, he either slipped and fell onto the driveline, or his clothing was caught and pulled by protruding parts of the rotating shaft. He was spun around the driveshaft, and portions of his clothing were entangled on the driveshaft and torn from his body. His wife approached the site of the incident when her husband had not returned to the farmhouse as expected, and found him entangled on the driveline. She called to the victim's brother who was working in the barn, and he freed the victim by cutting the tightly tangled clothes. The tractor engine was not running, although the key was turned to the on position. The brother summoned EMS, while the vicitm's wife began CPR. EMS responded within several minutes. The coroner's office was contacted, and pronounced the victim dead at the scene.

CAUSE OF DEATH: The death certificate listed the cause of death as traumatic asphyxiation.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: Farm equipment operators should observe and follow all applicable safety precautions when operating machinery driven by tractor power take-off equipment, including disengaging the PTO and stopping the tractor engine before approaching the machinery to make repairs, adjustments or perform maintenance.

Discussion: In this case, the farmer apparently turned the tractor engine on and engaged the PTO after replacing the bolt on the spreader driveline. He then dismounted the tractor and was standing next to the

rotating, unguarded driveline. He may have done this to inspect the operation of the driveline after his repair task was completed. When it is necessary to view an unguarded, operating driveline, two people should be involved if the tractor must be dismounted from the back (over the PTO). The tractor operator should remain seated, while a standby person is observing the driveline from a distance. The operator should start the PTO slowly, because projectiles may be thrown from the rotating driveline. When using a tractor where the operator dismounts from the front, the operator can leave the seat to observe the driveline from a distance, but should never get close enough to come in contact with the machine.

Recommendation #2: Farm equipment operators should identify machinery/equipment components that are PTO driven, and ensure that appropriate guards, recommended by the manufacturer or dealer, are installed.

Discussion: The manure spreader in this case was very old, and did not have a driveline guard when obtained by the farmer. It is unknown if a replacement or retrofitted guard could have been purchased. If a driveline is too old to accept a guard, farmers should contact the manufacturer or equipment dealer for recommendations on replacement of the driveline with a part that can be guarded.

Recommendation #3: Farm equipment operators should avoid wearing clothing that is loose-fitting, or has loose ends that could be caught by moving machine parts and lead to entanglement.

Discussion: When working around equipment, particularly rotating drive lines, workers should wear well-fitting clothing that is free of drawstrings, tabs and loops, loose threads or flaps of cloth that could be caught by a machine part. The victim in this incident was wearing a long loose-fitting coat. The incident might have been prevented if the victim's clothing was more form fitting without loose parts to be caught in the machine.